IDENTIFYING AND ANALYZING CHALLENGES IN ADMINISTERING CONSTRUCTION CONTRACTS OF THE LARGE PUBLIC PROJECTS IN BHUTAN

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ABSTRACT

Construction projects encompass three major phases: the pre-construction phase, the construction phase, and the post-construction phase. Although problems are inevitable in every phase, most of them are encountered during construction. A construction contract is a formal agreement between the contracting parties. An important contract document is the conditions of contract (COC), which entails the rules and regulations to administer the contract. In Bhutan, all public construction projects are mandated to follow the Bhutan Procurement Rules and Regulations 2019 and the Standard Bidding Documents for procurement of works 2019. Although these documents are updated regularly, administering them is often faced with various challenges. This paper identifies major gaps between the existing construction contract and the contract administration of the public projects in Bhutan. To identify the challenges in the contract administration, we conduct in-depth interviews with a group of local procurement professionals, government engineers, and contractors. As per the interviews, 16 out of 26 factors can cause challenges in the contract administration of the large public projects in Bhutan. The survey questionnaires are then prepared to measure the likelihood of occurrence and the impact of the factors on the project in terms of time and cost. Subsequently, the priority level of the factors are determined using the likelihood-impact matrix. The challenges identified in this study can help the relevant authorities make rational decisions and enhance the efficiency of the existing standard form of construction contract in Bhutan.

Keywords: *(Bhutan Construction Industry, Construction Contract, Large Public Projects, Conditions of Contract, Standard Bidding Document)*

1. INTRODUCTION

The construction industry is generally riskier than other industries because of its complexity in coordinating various activities. Each construction project is unique and embraces different engineering and managerial means, methods, techniques, and procedures [1]. Construction projects encompass three major phases: the pre-construction phase, the construction phase, and the post-construction phase. Although problems are inevitable in every project phase, most of them occur during the construction and a construction contract is prepared to legally enforce a set of mutually agreed terms and conditions. A construction contract is an agreement between an employer (client) and a contractor to construct, repair, modify, renovate, or even demolish something within an agreed time frame for an agreed price and as per agreed standards [8]. Construction contracts usually consist of several documents, including agreements, conditions of contract (COC), specifications, drawings, and bill of quantity (BOQs). An important contract document is the COC, which entails the rules and regulations to administer the contract. The COC outline the rights and responsibilities of the parties to the contract and present the requirements governing their business and legal relationships, as well as provide guidelines for administering the contract [2].

Examples of the standard forms of contracts, widely used in the construction industry are, the International Federation of Consulting Engineers (FIDIC), New Engineering Contracts (NEC) forms, the German Construction Contract Procedures (VOB/B) form, and the English Joint Contracts Tribunal (JCT) or the Institution of Civil Engineers (ICE). These documents are often modified to accommodate the requirements of each project. However, inconsistencies and discrepancies in existing

contracts are beyond the control of the contract drafters [3].

Globally, challenges in the construction industry are similar and congruent. However, these challenges are severe proportionately in developing countries [8]. According to past literature, some of the common challenges that are associated with the construction phase are variations and deviations from the initial contract, payment issues, and poor communication among the contracting parties, improper planning, and unforeseen ground conditions.

2. PROBLEM STATEMENT

In 2019, the construction industry in Bhutan contributed to greater than 16 percent of the Gross Domestic Product (GDP) and employed 4.5 percent of the labor force from 2,529 contractors [4]. The procurement of works in Bhutan accounted for the majority of the government procurement spending (47 percent of the total procurement during the tenth Five Year Plan between 2008 and 2013 [5]. However, public construction works did not have a good reputation when it came to the quality of infrastructure [6].

In 2016, the World Bank group assessed the procurement system of Bhutan based on the Public Expenditure and Financial Accountability (PEFA) 2016 Framework. The nation was rated by an overall score of B, which indicated that Bhutan had a good procurement system in place. The public construction projects in Bhutan must adopt the Procurement Rules and Regulations together with the Standard Bidding Documents (SBDs), regulated by the Ministry of Finance and these documents have been in place since 2009 (latest revision). Even though the General Conditions of Contract (GCC) in the SBD encompasses the essential elements of a contract, the public project delivery services are always one of the major challenges for the country.

The Good Governance Committee of the National Council of Bhutan presented a Review Report on the existing quality control mechanism of the public procurement system in 2016. According to the report, the GCC spell out inspection of quality of works but there is no mechanism for the responsibility and accountability for quality assurance. Due to lack of such mechanism, some agencies have weak monitoring and quality inspection systems [7]. Furthermore, delays and cost overruns in the public projects in Bhutan have been increasing every year, as presented by the Construction Development Board (CDB), Bhutan. CDB is an overseer of the construction industry in Bhutan. Table 1 displays the data regarding schedule delays and cost overruns in public construction projects between 2014 and 2019 [4].

Table 1 Schedule delay and cost overrun

Financial Year	Projects completed (Number)	Schedule delay	Cost overrun
2014-15	1041	2.78%	42.55%
2015-16	1091	23.6%	44.5%
2016-17	719	64%	81.4%
2017-18	494	52.2%	44.7%
2018-19	330	52.73%	65.76%

Thus, it is necessary to identify the gaps between the existing construction contracts and the practical management of public construction projects. The problems in managing the public construction projects in Bhutan have been persistent for a long time. Yet no specific study have been found to identify the gaps between the existing construction contracts and the practical management of public construction projects.

3. RESEARCH METHHODOLOGY

3.1. RESEARCH STEPS

This research study consists of seven steps, the details of each are as follows:

Step 1 Review theory and literature to gain insight into the construction contracts and general practices in different countries

Step 2 Review the form of General Conditions of Contract (GCC) in the Standard Bidding Document (SBD), 2019 for Procurement of Works (large), Bhutan

Step 3 Explore the common challenges in public construction contracts of Bhutan by conducting in-depth interviews with the practitioners.

Step 4 Compile the common factors causing challenges in administering the construction contracts of large public projects in Bhutan by analyzing the contents of the conversation from the interviews.

Step 5 Collect data on the likelihood of occurrence of the identified factors and their impact on the project by using survey questionnaires. A five-point likert scale is used to measure the likelihood of occurrence and the impact scores.

Step 6 Classify the identified factors causing challenges into three priority groups: high, medium and low, based on the likelihood-impact matrix.

Step 7 Conclude the study.

3.2. DATA COLLECTION

A total of 14 participants are selected for the in-depth interview using purposive sampling method. The interviews provide opportunities to interact with the participants and usually provide a detailed and comprehensive information. The participants are procurement professionals, government engineers and project managers as well as contractors registered with the Construction Development Board (CDB), Bhutan. The participants are required to have a minimum of five years of work experience. Semi-structured questions are used for the interview.

Following the in-depth interview, survey questionnaires are prepared to determine the likelihood of occurrence and the impact of the potential factors causing challenges in the project. The questionnaires are distributed to government engineers, and large and medium scale contractors in Bhutan. There are 20 districts in Bhutan and the engineering sector in each district is headed by the District Engineer (DE). Infrastructure development works are carried out at individual district level and the engineering sector executes all the projects within their jurisdiction. Therefore, these 20 DEs are selected as the representative of government engineers and the questionnaires are sent to them via email. A sample size of 50 out of 514 contractors is calculated by applying the formula explained below:

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e2\,N}\right)}$$

N = Population size

e = Margin of error (percentage in decimal form)

z = Z score

Z score is the number of standard deviations a given proportion is away from the mean.

The likelihood-impact matrix is used to classify the factors into three priority groups: high-priority, medium-priority, and low-priority as shown in Figure 1. As can be seen, the red area, the yellow area and the green area indicate the high-priority, the medium-priority and the low-priority group.

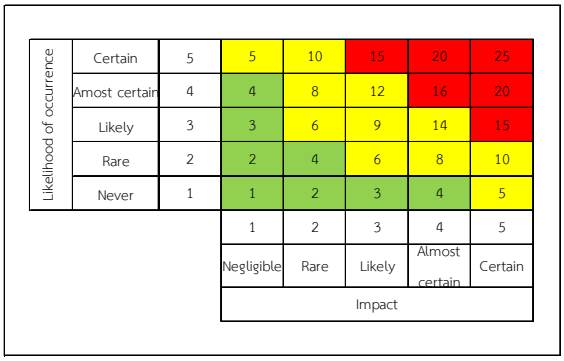

Figure 1 Likelihood-Impact matrix for factor classification

4. GENERAL CONDITIONS OF CONTRACT (GCC) IN THE STANDARD BIDDING DOCUMENT (SBD), 2019 FOR PROCUREMENT OF WORKS, BHUTAN

In Bhutan, the Procurement Rules and Regulations (PRR) 2019 and the SBD are the legal framework for any

public procurement of goods, works, and services. The documents are prepared and regulated by the Government Procurement and Property Management Division (GPPMD) under the Ministry of Finance. The government agencies are mandated to use the SBD in conjunction with the PRR for preparing the bidding documents and administering the projects. There are two types of SBD for the procurement of works based on the estimated value of the work as shown in Table 2.

Table 2 Types of Standard Bidding Documents (SBD)

Standard Bidding Document	Estimated value of work
Procurement of works (large)	Above Nu. 5 million
Procurement of works (Small)	Below Nu. 5 million

The SBD for procurement of works (large) consists sections:

Section I	Instructions to bidders (ITB)
Section II	Bidding data sheet (BDS)
Section III	Eligible countries
Section IV	Evaluation and qualification criteria
Section V	Bidding forms
Section VI	General conditions of contract (GCC)
Section VII	Special conditions of contract (SCC)
Section VIII	Specifications and performance requirements
Section IX	Drawings
Section X	Contract forms

The information about the contract specific needs of the agencies is provided in the BDS and the SCC. The detailed technical requirements are included in the specifications and performance requirements, as well as drawings. Once the work is awarded to the winning contractor, the form of GCC along with the SCC is the principal contract document between the government agency and the contractor for administering the project. This standard form of contract is designed to be used for unit-price contracts and lump-sum contracts with the traditional project delivery method (Design-Bid-Build). The bidders have to quote their bid prices according to the design of the project provided by the agency.

5. IDENTIFICATION OF FACTORS CAUSING CHALLENGES IN LARGE PUBLIC CONSTRUCTION CONTRACTS OF BHUTAN

A total of 26 factors causing challenges in large public construction projects are identified from the in-depth interview. These factors are categorized into three groups: the pre-construction, construction stage and general issues, based on the nature and frequency of occurrence, as shown in Table 3. Most of the challenges in Bhutan are similar to the contractual problems that are identified in previous literature of various countries. Lack of value engineering, inaccurate performance rating of contractor, lack of insurance for workers, and delay in taking over the completed work by the employer are some challenges that are unique to the construction contracts of Bhutan. Out of 26 factors that are causing challenges in administering the large public construction projects, 16 factors are found to be associated with the construction stage and these are issues that can be generally addressed by the General Conditions of Contract (GCC). These 16 potential factors are further analyzed to determine the priority level based on the likelihood-impact matrix. Rest of the factors are grouped under the category of pre-construction stage and general issues.

6. DESCRIPTION OF THE POTENTIAL FACTORS

6.1. CONTRACT TERMINATION

Generally, when a contract is signed the owner requires the contractor to furnish a performance security to guarantee that the work will be completed. In case, the contractor is at fault and the contract terminated by the employer before the work is completed, the owner is entitled to forfeit the performance security. The SBD of Bhutan is silent about the forfeiture of performance security upon contract termination.

6.2. DELAY IN MATERIAL PROCUREMENT

Some materials and special equipment procured from manufacturers directly require 100% upfront payment. The current rules do not permit this practice.

Pre-construction stage	Construction stage		General issues
1. Poor estimate by employer	1. Absence of committed resource of contractor	2. Bad weather	1. No separate SBD for medium and large works
2. Unrealistic project duration	3. Poor supervision by employer	4. Change in scope	2. Non-compliance with contract condition
3. Insufficient planning	5. Contract termination	6. Delay in material procurement	3. Mis-interpretation of provisions in SBD
4. Confidentiality of bid evaluation report	7. Delay in progress payment	8. Financial mis-management by contractor	4. Labor shortage
5. Low bid award	9. Incompetent contractor	10. Lack of value engineering	
6. Inadequate drawing and specification	11. Cost of site amenities on contractor	12. Delay due to arbitration process	
	13. Delay in taking over the work by employer	14. Incorrect average performance score of contractor	
	15. Lack of cost compensation event	16. Lack of insurance for workers	

6.3. DELAY IN PROGRESS PAYMENT

The payments are made when the completed work is informed by the contractor and verified by the employer (engineer). The engineer usually delay the verification process of the completed work and this results in delayed progress payment to the contractors.

6.4. FINANCIAL MIS-MANAGEMENT BY CONTRACTOR

In several projects, the contractor misuse the advance payment for mobilization provided by the employer to start the work.

6.5. INCOMPETENT CONTRACTOR

Some contractors cannot understand the contract documents. Lack of required knowledge makes it difficult for them to communicate with the employer.

6.6. LACK OF VALUE ENGINEERING

Once the contract is executed, the standard contract document does not contain any provisions to encourage either party to propose new ideas. Any new knowledge or proposals of new technologies should be welcomed to improve the efficiency of the project.

6.7. COST OF SITE AMENITIES ON CONTRACTOR

Once the site is handed over to the contractor, the cost of amenities related to the project must be borne by the contractor only.

6.8. DELAY DUE TO ARBITRATION PROCESS

The contractor and the employer often resort to arbitration process when they are not able to resolve some issues during the project implementation. An arbitration process takes time to resolve the issues, which in turn affect the progress of the projects.

6.9. DELAY IN TAKING OVER THE COMPLETED WORK BY EMPLOYER

In construction contracts, time limits are usually specified for the critical processes. However, in the current standard document of Bhutan, there is no time limit specified for the employer to take over the completed

work from the contractor. The contractor has to depend on the employer to close out the project and it affects the contractor when the employer delays it.

6.10. INCORRECT PERFORMANCE RATING OF CONTRACTOR

In Bhutan, the engineer of the employer must rate the performance of the contractor when the project is completed to differentiate the well performing contractors from those who are not. In reality, such ratings are mostly provided based on the personal relation between the parties. This results in an unfair evaluation of the contractor's performance.

6.11. LACK OF COST COMPENSATION EVENT

Typically, a compensation event in a construction contract refers to time and cost compensations. Yet, the SBD of Bhutan has only time compensation provision.

6.12. LACK OF INSURANCE FOR WORKERS

There is no requirement of insurance for the construction workers.

7. ANALYSIS OF THE POTENTIAL FACTORS

Survey questionnaires were used to assess the likelihood and impact of the 16 potential factors that can cause challenges in the construction stage of large public projects in Bhutan. 13 out of 20 (65%) government engineers and 15 out of 50 (31%) contractors submitted valid responses and the overall response rate is 40%. Response rate of 20-30% is acceptable for postal questionnaire in the construction industry [8]. The participants of this survey possess work experience of at least five years and half of them have more than 10 years of work experience.

The likelihood of occurrence is measured in terms of frequency of occurrence and the impact is measured in terms of impact on time and cost of the project. The priority level of each factor is determined by multiplying the average scores of likelihood and impact from the survey. Then with the help of likelihood-impact matrix, the factors classified into three different groups. The factors in the low-priority groups indicate that a minimum impact on the project and their occurrence is never or rare. Those in the medium-priority group may occur during the construction but will have moderate impact on the project. The factors in the high-priority group occurs frequently and will have the maximum impact on the project. Based on the analysis results of likelihood of occurrence and impact on the time and cost of the project, all 16 factors are in the medium-priority group, with none in the low and high-priority level group as shown in Figure 2 and Figure 3.

The analysis results suggest that, amongst the 16 potential factors, delay in taking over the completed work by employer and contract termination has the least impact on both the time and cost of project. Whereas, incompetent contractor has the highest impact on the time of the project and cost of site amenities on the contractor has the highest impact on the cost of the project. According to the likelihood of occurrence, incompetent contractor is also the most frequently occurring factor that causes challenges at the project site. Therefore, incompetent contractor has the highest level of priority with high likelihood of occurrence and highest impact on the time of the project.

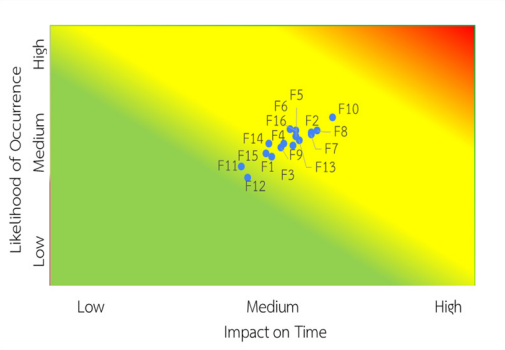

Figure 2 Likelihood-Impact on time matrix

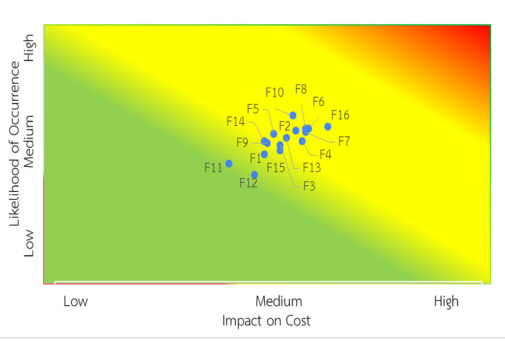

Figure 3 Likehood-Impact on cost matrix

8. CONCLUSION

A total of 26 factors causing challenges in the large public projects of Bhutan were identified from the exploratory survey. Out of 26, 16 factors associated with the construction stage are considered as the potential factors causing challenges in administering the construction contracts of large public projects. These are challenges that can be addressed by the General Conditions of the Contract (GCC) of the standard bidding document. Based on the analysis results of likelihood of occurrence and impact on the time and cost of the project, all 16 factors are of medium-priority level, with none in the low and high-priority level group. Incompetent contractor has the highest, and delay in taking over the completed work by employer and contract termination has the least priority level.

The challenges caused by these 16 factors that are identified in this research can be addressed by the GCC in the SBD of Bhutan by either adding new provisions or modifying the existing clauses. Further studies are recommended for the management of these challenges in administering the construction contracts of large public projects in Bhutan.

9. ACKNOWLEDGMENT

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10. REFERENCES

[1] Surahyo A. Understanding Construction Contracts [English]: Springer International Publishing; 2018.

[2] Goldbloom J. The General Conditions of the Contract. Engineering Construction Specifications: The Road to Better Quality, Lower Cost, Reduced Litigation. Boston, MA: Springer US; 1989. p. 31-142.

[3] Iyer KC, Chaphalkar NB, Joshi GA. Understanding time delay disputes in construction contracts. International Journal of Project Management. 2008;26(2):174-84.

[4] Construction Development Board. Annual Report 2018-2019. Bhutan: Construction Development Board; 2019.

[5] World Bank Group. Bhutan - Public financial management performance report Public Expenditure Review. Washington, D.C: World Bank Group; 2016 2016/09/07. Report No.: 110293.

[6] Ministry of Works and Human Settlement. National Construction Industry Policy. Bhutan: Ministry of Works and Human Settlement 2020. p. 57.

[7] Good Governance Committee. Review Report on the Public Procurement System. Bhutan: National Council 2016.

[8] Lew LP, Dr. H.C Tan, Wong DSCM. Issues and Challenges Faced in the Management of Claims for

[9] Construction Projects. Construction Project Management. 2014.